
Introduction

In today's presentation you learned about the environmental damage that occurred as a result of 30 years of dumping of DDT in the Pacific Ocean at the Palos Verdes Shelf and around Santa Catalina Island. Montrose and others have been ordered to pay \$140 million for discharging DDT into the Pacific Ocean around Santa Catalina Island and a portion of this money will be used for the restoration of wildlife on Santa Catalina Island.

NOAA and other government agencies want to hear from the public how this money should be spent. In this exercise you will be given information about an actual restoration projects taking place on Santa Catalina Island. In order to determine whether these projects are worth funding you will be asked to evaluate the projects.

Bald Eagle Restoration Project

Restoration Goals

- Reintroduction of bald eagles to Santa Catalina Island
 - Remove marine mammal carcass
 - Supplement bald eagle diet with clean food
 - Enhance bald eagle nesting habitat

Background Information

Garcelon, David K., 1994. *Effects of organochlorine contaminants on bald eagle reproduction at Santa Catalina Island*. Institute for Wildlife Studies, Arcata, California. pp 2-3.

Between 1980 and 1986, 33 chicks were brought to Catalina Island, reared on artificial nest platforms, and released (Garcelon, 1988). Blood samples taken from one- and two-year-old eagles during the early years of the project revealed high levels of DDE (Garcelon, et al., 1989).

The first nesting attempt which resulted in egg production occurred on Santa Catalina Island in 1987. Eggs laid in 1987 and 1988 broke while in the nests, and one egg laid in 1989 disappeared from the nest. Subsequent contamination analysis of egg remains revealed DDE levels sufficient to cause complete reproductive failure (Garcelon et al., 1989).

Starting in 1989, eggs were removed from nests shortly after they were laid in order to facilitate hatching them under controlled conditions. Dummy eggs (fabricated from resin to look like eagle eggs) were placed into the nests to maintain the birds' breeding behavior. Since that time, artificial incubation and special techniques to control water loss have been utilized in an attempt to hatch 17 eggs removed from four bald eagle

territories on Santa Catalina Island. Although incubation techniques are well established, only three (18%) of these have been successfully hatched.

Foster eagle chicks or eggs from wild donor nests have been placed into nests of Santa Catalina Island in situations where the native Catalina eggs did not hatch in captivity. Of the eight chicks introduced to nests on Santa Catalina Island, all but two chicks successfully fledged. All four of the eagle pairs that have nested on Catalina have successfully raised chicks. Thus, if eagle pairs on Catalina are provided with either a relatively clean or healthy chick, they are able to successfully rear offspring.

The concentration of DDT in the fish species collected around Catalina Island does not, on its own, appear high enough to cause severe reproductive problems in bald eagles. However, bald eagles also eat birds and marine mammal carcasses, and those food sources contain high levels of DDE. Together with the large quantities of fish they consume (which have relatively low levels of DDE) the DDE in the birds and mammals they eat is enough to impair the bald eagles' reproduction. Some ways that the diet of the bald eagle can be improved include removing marine mammal carcasses from beaches and supplying clean food sources.

Background Information Based on the Following Resources:

Chartrand, A.B., S. Moy, A.N. Safford, T. Yoshimura and L.A. Schinazi. 1985. Ocean dumping under Los Angeles Regional Water Quality Board permit: A review of past practices, potential adverse impacts and recommendations for future action. California Reg. Water Quality Control Board, Los Angeles Region, March 1985. 47 pp.

Garcelon, D.K. 1988. The reintroduction of bald eagles on Santa Catalina Island, California. Ms. Thesis, Humboldt State University, Arcata, California. 58 pp.

Garcelon, D.K., R.W. Risebrough, W.M. Jarman, A.B. Chartrand, and E.E. Littrell. 1989. Accumulation of DDE by bald eagles reintroduced to Santa Catalina Island in Southern California. Pages 491-494. Proceedings of the Third World Conference on Birds of Prey and Owls, Israel.

Healthy Fish Restoration Project

Restoration Goals

- Provide anglers with more clean fish
 - Create artificial reefs on deep and shallow shelves
 - Develop new fishing locations
- Survey fish for contaminants
 - Advise the public when high levels of DDE are detected in monitored fish

Background Information

National Oceanic and Atmospheric Administration. 2003. Montrose settlements restoration program. <http://www.darcnw.noaa.gov/montrose.htm>. pp. 2-3.

Sports and Commercial Fish. The State of California has issued health advisories for many common sports fish in the L.A. area (approximately 50 species in eight groups). These fish have levels of DDT/DDE that exceed the State of California trigger level (0.1 µg/g), which was set to protect local residents who could frequently consume these fish.

National Oceanic and Atmospheric Administration. 2003. *Fish contamination survey in Southern California – survey of chemical contaminants in subsistence and sport fish from Los Angeles, Ventura, and Orange Counties.* <http://www.darcnw.noaa.mon-faq1.pdf>

What is this project?

A group of government agencies is collaborating to survey chemical contamination in local marine fish that are commonly caught by subsistence and sport anglers.

What government agencies are doing this survey?

These are the Federal and State natural resource agencies headed by NOAA working in collaboration with the U.S. EPA (Environmental Protection Agency). The natural resource agencies have formed a group called the “Montrose Settlements Restoration Program” (MSRP), which includes the California Department of Fish and Game, California State Parks, California State Lands Commission, NOAA, National Parks Service, and US Fish and Wildlife Service.

How will the survey be done?

The fish collection began in 2002. Chemical analysis of the fish takes about 6 months. Surveyors will analyze 24 species of fish. In total between 3000 and 6000 fish will be surveyed. 435 to 870 of the fish surveyed will be white croaker, a species known to be highly contaminated in the L.A. area.

Why did you choose these 24 species of fish?

A group of experts chose these fish for three reasons:

1. Overall, these are the most common fish caught by subsistence and sport anglers along the Los Angeles coastline.
2. We know, or suspect, that some of these fish are highly contaminated with DDT.
3. We have evidence that some of these fish are low in contamination and would be good choices for anglers to catch and eat.

How much coastline will you cover in this survey – where will you catch these fish?

We will be catching fish at 29 sites along the coast between Ventura and Dana Point. Most of the sites are in Los Angeles County and will include the locations where most anglers fish in L.A. County.

Why are you surveying this section of coastline?

From previous studies, we know the most highly contaminated fish are found between Redondo Beach and Long Beach, including Palos Verdes area and L.A.-Long Beach Harbors. Based on 1987 data, the State of California issued fish consumption advisories for locations between Malibu and Newport Beach. A fish consumption advisory informs the public whether or not it is safe to eat certain species of fish and fish caught in particular water bodies. Contamination may change over time, so we want to determine the coastal pattern of chemical contamination in common sport and subsistence fish at the present time.

What kind of projects will help protect the public from contaminated fish and restore fishing?

The agencies are considering four categories of projects:

1. Removing the detrimental effects of contaminated sediments. Most of the DDT causing the fish contamination are now coming from the sea bottom sediments of the Palos Verdes Shelf and Santa Monica Bay. US EPA is studying ways to reduce the extent to which these DDT contaminates local fish.
2. Health advisories and commercial fishing bans. EPA is working with California State health agencies to examine the existing fish consumption advisories and ban of commercial fishing for white croaker near Palos Verdes.
3. Public information. Environmental government agencies are collaborating with community organizations and health agencies to give the public information about avoiding contaminated fish and selecting cleaner fish. This includes better signs at fishing locations, more effective educational programs, and better publicity about the fish contamination problems along the coasts of Los Angeles and Orange Counties.
4. Restoration of fishing for clean fish. MSRP is now examining habitat improvement projects that may be able to decrease the availability of contaminated fish while increasing the abundance of clean fish. Building an artificial reef to contain the contaminated sediments is one method for habitat improvement.

National Oceanic and Atmospheric Administration. .2001. The Montrose Settlement Restoration Program. <http://www.darcnw.noaa.gov/mon-scop2.pdf>

There is some controversy as to whether constructed reefs actually increase the production and overall population of fish or merely attract fish; however, Ambrose (1994) provides evidence that the production of fish on relatively large constructed reefs in Southern California is about nine times greater than on adjacent sand habitat. Constructed rocky habitat could serve the purpose of provide local anglers with a greater availability of fish (Ambrose, 2000).

Restoration Project Evaluation Instructions

- I. The objective of this activity is for you to evaluate the restoration project currently underway on Santa Catalina Island. You will be assigned one of the two restoration projects described on the information sheets in your workbook.

Under the headings *Likelihood of Success*, *Duration of Benefits* and *Effects of Restoration Activity on Human*) you will be asked a set of questions about that project, which you can answer using information provided in the project description. (You should also use information from the rest of your lesson notes.)

To answer the next set of questions, under the heading *Interactions with the other Restoration Project*, you will need to read the description of the other restoration project. Then, you will describe ways that the activities undertaken as a part of your restoration project might affect the other project.

The project descriptions you have been given are very brief, and you would need much more information to evaluate them. For each of the headings above, come up with at least three pieces of information that would help you to evaluate your project. Then suggest a way the information could be collected.

The following are guidelines for the evaluation criteria:

Likelihood of Success

Projects should be evaluated for their potential success, including level of expected return of bald eagles, seabirds, and clean fish. A way to measure success must be defined.

Duration of Benefits

Contamination by DDT is expected to continue for decades. Long-term benefits are the objective of these projects, and each project should be evaluated for how long the benefits of restoration would last.

Effects of Restoration Activities on Humans

Projects should be evaluated for possible public health and safety benefits, as well as possible harm. Consider how the public would feel about the restoration activity; would they be in favor of it?

Interactions with the other Restoration Project

Read about the other proposed restoration project and consider how the proposed activities from your restoration project will interact with the other restoration projects.

- II. Now based on the information you have and other information you have learned in this unit, write a paragraph evaluating your group's restoration project. Include what parts of the restoration project you believe are most important and which are not as important.

EVALUATION SHEET – Bald Eagle Restoration Project**Likelihood of Success***Background Information*

- 1) When scientists noticed that the bald eagles on Santa Catalina were suffering from total reproductive failure, what two methods were used to reintroduce young eagles?
- 2) What percentage of artificially incubated eggs has hatched successfully?
- 3) What has been the success rate for foster eggs and chicks on Santa Catalina Island?

Needed Additional Information

- 1)
- 2)
- 3)

Duration of Benefits (How long will restoration activities be necessary to sustain the bald eagle population?)*Background Information*

- 1) Based on your bald eagle data from lesson 4, how long will bald eagles need to be reintroduced to Santa Catalina Island? Why?
- 2) What must the bald eagle egg concentration of DDE be before restoration activities on Santa Catalina Island can be stopped?

Needed Additional Information

1)

2)

Effect of Restoration Activity on Humans*Background Information*

1) Why is restoring bald eagles to Santa Catalina Island important?

Students might come up with several answers such as bald eagles are the national bird and that bald eagles (along with other plants and animals) have as much of a right as humans do to live in a safe environment.

2) If fish are used to supplement the bald eagles' diet, how might this affect humans?

This may provide less fish for commercial anglers.

Needed Additional Information

1)

2)

3)

EVALUATION SHEET – Healthy Fish Restoration Project**Likelihood of Success***Background Information*

- 1) Explain the benefit of heavily sampling white croaker for DDE contamination.
- 2) What is the difference between fish production on artificially constructed reefs and in sand habitats?

Needed Additional Information

- 1)
- 2)
- 3)

Duration of Benefits (How long will the benefits from the restoration work (such as artificial reefs) last? and how long will it be necessary to continue monitoring?)*Background Information*

- 1) If artificial reefs are installed, what kind of fish would you want to monitor for DDE contamination to determine if the artificial reefs are providing a clean habitat for fish?

Needed Additional Information

- 1)
- 2)

Effect of Restoration Activity on Humans*Background Information*

- 1) What ways will the information from the survey be made available to the public?

- 2) What criteria have government scientists used to determine which fish they will monitor for DDE contamination?

Needed Additional Information

- 1)
- 2)
- 3)

Interactions with the other Restoration Project

List two ways that the Bald Eagle Restoration Project might interact or affect the Healthy Fish Restoration Project.

- 1)
- 2)